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LOAN PAPER

BANGLADESH - AGRICULTURAL INPUTS

Proposal and Recommendations
for the Review of the
Bureau for Asia Advisory Committee

UNCLASSIFIED

1974 ?

BANGLADESH - AGRICULTURAL INPUTS

SUMMARY AND RECOMMENDATIONS

1. Borrower: The Peoples' Republic of Bangladesh
2. Amount of Loan: \$25,000,000 (Twenty-Five Million)
3. Loan Terms: 40 years, including a 10-year grace period on the repayment of principal with interest at 2 percent per annum during the grace period and 3 percent per annum thereafter.
4. Purpose of the Loan: To finance the foreign exchange costs of procuring, shipping, insuring and inspecting chemical fertilizers, fertilizers raw materials, granular pesticides and other agriculture inputs.
5. Executing Agencies: The Bangladesh Agriculture Development Corporation and the Bangladesh Fertilizer Chemical and Pharmaceutical Corporation.
6. Background of Loan: High-yielding seed varieties, fertilizers, pesticides and irrigation are central to the EDG's strategy for achieving its goal--food grain self-sufficiency. Many of these critical inputs must be imported and, due to its severe shortage of foreign exchange, the BDG is looking to aid donors for help. The proposed loan will finance a portion of the imported inputs required by the BDG to increase food production during the crop year beginning in October 1974.
7. EXIM Bank Interest: EXIM Bank has indicated it has no interest in the proposed loan.
8. Mission's Views: The Mission endorses the proposed loan.
9. Statutory Criteria: Satisfied.
10. Recommendations: That a loan in the amount of \$25,000,000 (Twenty-Five Million Dollars) be authorized.

USAID Project Committee

Chairman and Loan Officer

David H. Mandel

AID/W Project Committee

Chairmen and Loan Officers

Loan Officer

Agricultural Economist

Commodity Specialist

Country Desk Officer

Legal Advisor

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Domenick J. Scarfo, ASIA/CD
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Charles Jenkins, SER/COM/A
Abbe Fessenden, ASIA/SA/B
Cynthia Goldstein, GC/ASIA

BANGLADESH - AGRICULTURAL INPUTS LOAN

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BANGLADESH - AGRICULTURAL INPUTS

Definitions of Rates, Weights and Terms

Currency

U.S. Dollar \$1.00 = 7.5 Taka

Weights

One Maund = 82.2 pounds

Metric Ton (MT) = 2,204.6 pounds (26.82 Maunds)

Accronyms

Tennessee Valley Authority = TVA

International Bank for Reconstruction and Development = IBRD

Government of Pakistan = GOP

Government of Bangladesh = BDG

Bangladesh Agricultural Development Corporation = BADC

Bangladesh Fertilizer Chemical and Pharmaceutical Corp. = BFCI

Bangladesh First Five-Year Plan (1973-1978) = FYP

Thana Central Cooperative Associations = TCCA's

Primary Cooperative Societies = KSS

Fertilizers

Triple Super Phosphate (0-46-0) = TSP

Diammoniom Phosphate (18-46-0) = DAP

Muriate of Potash = MP

Nitrogen = N

Phosphorous Pentoxide = P_2O_5

Potassium Oxide = K_2O

Complex fertilizers containing Nitrogen, Phosphorous and Potassium = N-P-K

Rice Seasons

The aus season (about one-third of the total paddy acreage) takes advantage of the scattered spring rains; the crop may suffer from drought in some areas, especially during the early part of the season. There may be serious weed problems. The aus crop is harvested during the monsoon; drying and storage is therefore difficult.

Aus seedling is done between 15 March and 15 May (broadcast); or seedlings may be transplanted between 1 March and 15 April. The crop is harvested between mid-July and mid-September.

The aman season (nearly 60 percent of the total paddy acreage) uses the heavy monsoon rains; wide areas may have water up to 15 or 20 feet deep. If the rice seed is broadcast, the yield is poor, but only broadcast-sowing is possible in deep water. Transplanted aman is the major rice crop accounting for about 65 percent of the total aman area. Seedlings are raised in nurseries in June-July and transplanted to puddled fields in July-September; or seeds are broadcast between mid-March and the end of April. The aman crop is harvested between mid-November and mid-January.

The boro (winter) crop has dry weather during its growth period and temperatures are low. Its acreage is limited to low-lying areas where flood-water is receding and growth can be sustained by residual soil-moisture--or by some form of irrigation (traditional, low-lift pump, tubewell or gravity diversion). Seeds are planted from September on, or seedlings transplanted between November and February; the crop is harvested between the end of March and May.

I. Introduction

The economy of Bangladesh is predominantly agricultural. About 90 percent of the country's population is rural, and about 80 percent of the rural population are engaged in agriculture. Agricultural output accounts for about 60 percent of the gross domestic product and about 90 percent of exports. During the 1960's, agricultural production increased at a rate of about 2.5 percent a year, but did not keep pace with the increase in population which was, and is, increasing at about 3.0 percent a year.^{1/} As a result there has been a steady increase in food imports, which rose from 0.7 million tons in 1960-61 to 1.5 million tons in 1969-70.

At the start of the 1970's (1970-1972), agricultural production decreased, partly due to the war and partly due to poor monsoons, and the Government was confronted with a serious foodgrain situation. Record levels of food imports of about 2.5 million tons in 1972 and 2.4 million tons in 1973 prevented a widely feared famine from occurring. In the current fiscal year (1973-74), weather conditions have been favorable and a record foodgrain harvest is expected; but even so Bangladesh will still need to import about one million tons in calendar year 1974, without thereby achieving an increase in the consumption level or the build-up of stocks. The future is difficult to assess. The import needs may remain at the current level of one million tons or if inputs are not available or the weather is unfavorable, it could increase to the 1972-73 level. In any event, it is certain that Bangladesh will continue to require substantial foodgrain imports for a number of years.

The First Five-Year Plan which ends in 1978 sets as a primary objective self-sufficiency in the production of foodgrains. To accomplish this target, the country will have to increase foodgrain production over the plan period by 6.4 percent per annum annually compounded or by a total of 36 percent. The following table presents projections relevant to achieving self-sufficiency. Per capita consumption is assumed to remain at its present level.

^{1/} Per capita consumption has also been increasing at about one percent a year resulting in an annual increase in foodgrain demand at around 3.3 percent.

TABLE I

Annual Requirement and Projected Production
of Foodgrain during the Plan Period

<u>Year</u>	<u>Population (millions)</u>	<u>Foodgrain Consumption Requirement (millions of tons)</u>	<u>Gross Production of Foodgrains (millions of tons)</u>	<u>Foodgrain Available for Consumption (millions of tons)*</u>	<u>Deficit/ Surplus (millions of tons)</u>
1973-74	76.2	12.0	12.1	10.8	1.2
1974-75	78.5	12.4	13.2	11.9	.49
1975-76	80.9	12.8	13.8	12.4	.34
1976-77	83.1	13.1	14.4	13.0	.14
1977-78	85.4	13.9	15.4	13.9	Nil

* After deducting 10 percent from the gross product for seed, *FCO*
AND WASTE,

In order to achieve its target, the BDG plans to (1) expand cropped area by multiple cropping through irrigation and flood control and (2) increase yields per acre.

Part one of the strategy, increasing the cropped area, can only be achieved gradually over many years. The total land area of Bangladesh is 33 million acres of which 22.4 million acres can be and are cultivated. Of this cropped area, approximately 8 to 10 million acres are now multiple cropped.^{1/} Of the remaining cultivable acreage, 2 million acres are so severely flooded during the monsoon that only one crop can be planted and another 6 million acres are flooded to a depth at which only broadcast aman with a nine month growing season can be planted. To bring these 8 million acres under multiple cropping will require major flood control programs, some of which are underway, but which will take many years to complete.

Most of the remaining arable land that is not presently multiple cropped nor subject to annual flooding is too dry for five or six months of the year to produce an additional crop; double cropping will therefore require irrigation. Again, programs of this type, while started, will require years for completion.

^{1/} According to the FYP the cropping intensity is 146 percent.

Part two of the strategy, increasing yields, does have potential for quicker results. Crop production has not yet been characterized by the sufficiently wide-spread use of new techniques and practices which have resulted in dramatic achievements elsewhere. Consequently, yields per acre in Bangladesh are among the lowest in Asia. To improve yields, Bangladesh intends to concentrate on rice production, which accounts for 95 percent of foodgrain production, firstly by increasing the acreage under high-yielding seed varieties from 2.6 million acres to 9.0 million acres and, secondly, by providing to these areas the necessary agriculture inputs--fertilizers, plant protection materials and credit.

It is unlikely that these Government's targets will be met, but every effort must be made to at least approach them. One major problem Bangladesh will face in this program is obtaining and properly using fertilizers and plant protection material. Since each is dependent on the other--high-yielding varieties are only fully responsive with application of fertilizer and the increase in fertilizer use triggers an increase in pests and disease requiring plant protection material--a reduction in the use will mean a reduction in foodgrain production.

The purpose of this loan will be to assist the Government of Bangladesh in acquiring the fertilizer and pesticides for approximately one crop year beginning with the boro crop planted in November/December 1974 and ending with the aman crop planted in June/July 1975. The loan will succeed the Relief and Rehabilitation Grant which allocated funds for the purchase of rock phosphate and finished fertilizers for the aman crop planted in June/July 1974. Sections II and III of this paper analyze Bangladesh's requirements for fertilizer and pesticides.

II. Fertilizers

Consumption

Chemical fertilizers were first used in 1955-56 when 11,000 MT of ammonium sulphate were sold to farmers. In 1960-61 urea, triple superphosphate and muriate of potash appeared in notable quantities. Since then sales of these fertilizers have increased by an average of 20 percent a year with only a moderate decline in 1970-71, a year when the economy was disrupted by the war with Pakistan. Even with this impressive growth rate, Bangladesh's fertilizer consumption is among the lowest in the world.^{1/} Annex F gives the annual consumption figures from 1955 to 1973.

Most soils require a mixture of the three major plant nutrients--nitrogen, phosphate and potash--and they are best provided to the farmer in a chemically or physically blended fertilizer. To date, however, Bangladesh has used only fertilizers containing one nutrient. This has resulted in the improper application of fertilizer by the Bengali farmer, partly because of the non-availability of more than one fertilizer at the proper time and partly because of ignorance. The full benefit from fertilizer use has therefore not yet been realized. The Government is aware of this problem; future plans call for the introduction of complex fertilizers starting with di-ammonium phosphate (DAP) which would supply both nitrogen and phosphate.

Marketing and Distribution

All fertilizers regardless of their source are procured by the Bangladesh Agriculture Development Corporation (BADC) and distributed by it to the thana (county) level. BADC maintains a network of fertilizer warehouses of various sizes throughout the distribution system (port, district headquarters and thanas) with a total storage capacity of 341,600 MT. The space is at present marginally adequate but with the projected growth in fertilizer use additional facilities will need to be built. During the FYP, 289 warehouses are to be built. Annex H gives the detail of the present warehouses and their capacities.

The movement of fertilizers from factory or port to the point of use is at present a serious constraint to increased sales. Most of

^{1/} Bangladesh uses an average of 6 lbs. of plant nutrient per acre; the Netherlands use 541 lbs., Japan uses 316 lbs., and the U. S. uses 63 lbs.

the transportation facilities are inadequate, in poor repair and ill-managed, which results in late delivery of material and a high level of loss due to bag breakage (material imported in bags is handled 13 times before it reaches the farmer). In addition, material is often in the wrong place at the wrong time, due to poor forecasting of needs.

At the thana level BADC wholesales the fertilizer to approximately 28,700 retailers in 357 thanas. In the remaining 63 thanas wholesale distribution, including control of the warehouses, has been turned over to the Thana Central Cooperative Associations (TCCA's) created under the Integrated Rural Development Program (IRDP). These TCCA's sell to registered retailers, either Primary Cooperative Societies or private dealers.

The involvement of the TCCA's and their primary societies may, however, create additional problems in the short run, since the TCCA's are required to pay BADC in full on delivery. Since they have only limited funds, and less knowledge than BADC of their requirements and the time phasing of sales, the TCCA's are likely to wait until the last moment before ordering, often too late to meet the demand.

The retail system also has its problems. Retail dealers are paid a gross commission of TK. 40 per ton. On the average, each dealer sells about 14 tons a year and earns about TK. 500. Clearly, this small income from sales does not provide an incentive to promote fertilizer nor the funds to finance any promotional activity.

While the existing system is thus not without flaws, it has worked well enough to allow a 20 percent increase in consumption a year. It will continue to be adequate for possibly another year or two, but the future quantum jumps required to obtain foodgrain self-sufficiency will not be possible unless the system functions better.

Steps are being taken to bring about improvements. A four-man team from TVA is now conducting a two-month study on all aspects of fertilizer production and marketing in Bangladesh. The study is being financed by AID. This study will be succeeded by a more detailed study focusing on specific elements of marketing and distribution; that study will also be undertaken by TVA and will be financed by the World Bank. (The scope of work for Phase One of the TVA study is included as Annex D.) Once these studies are completed, the BDG can outline specific steps it intends to take and request assistance, both technical and financial, necessary to take them.

Fertilizer Requirements

Most projections of fertilizer requirements are based on economic considerations, i.e., the optimum application per acre per crop multiplied by projected crop acreage. Such projections are, however, useful only as targets. They do not take into account such factors as the capacity of the distribution system, the cash and credit available to the farmer, the availability of the material at peak periods and extension services available to assist the farmer in proper applications. While the Government of Bangladesh forecasts its needs during the FYP on a somewhat different basis, it, too, ignored the constraints in achieving the target. For our purposes we have, therefore, ignored the FYP projections and have used a 20 percent average increase a year, based on the consumption of urea, TSP and potash rate for the years FY 1966 through FY 1973 (see Annex F). While it is not a sophisticated method, we believe it to be more realistic. The following table compares the two projections:

TABLE 2

Add. Requirements
Actual and Projected Fertilizer Sales, by Type
 (in thousands of metric tons)

	<u>Actual</u>		<u>Projected</u>				
	<u>FY 1971</u>	<u>FY 1973</u>	<u>FY 1974*</u>	<u>FY 1975</u>	<u>FY 1976</u>	<u>FY 1977</u>	<u>FY 1978</u>
			<u>AID/FYP</u>	<u>AID/FYP</u>	<u>AID/FYP</u>	<u>AID/FYP</u>	<u>AID/FYP</u>
Urea	212	272	238/274	326/342	392/423	470/518	564/616
TSP	76	88	105/154	126/173	151/207	181/254	217/332
MP	18	18	20/38	24/74	29/104	35/134	41/187

* The 1974 figures are based on reported sales for nine months.

Sales of urea and potash have lagged seriously in the current year primarily because of late delivery to retail sales points. TSP sales of 105,000 MT represents a creditable performance that could have been better without the delays at the ports of entry which occurred. In April, prices of all fertilizers were increased and there was an immediate slowdown in sales. We do, however, expect that sales in May and June will be higher and will compensate for this decline.

The difference between our projections and those of the FYP for potash are very high. From our experience farmers are not convinced that potash is really necessary (it does not provide the immediate visible results of nitrogen) and much more education will be needed to convince the farmer of its economic value.

Fertilizer Supply

Bangladesh obtains part of its fertilizers from imports and part from following domestic manufacturing plants:

TABLE 3

<u>Unit</u>	<u>Year Completed</u>	<u>Products</u>	<u>Annual Design Capacity</u>
Fenchuganj	1961	Urea	110,000
		Ammonia	12,000
		Sulphate	
Ghorasal	1971	Urea	340,000
Chittagong I	1970	TSP	32,000
Chittagong II	1973	TSP	120,000

The Fenchuganj plant, in addition to being old and in poor repair, was damaged during the war. At present it is only operating at about 40 percent capacity, but even at that low rate production is not continuous. It is unlikely that it will ever again achieve its design capacity. When the next urea plant is built, the Fenchuganj plant should probably be scrapped. The Ghorasal plant is relatively new and of the latest design. It is presently only operating at 60 percent of design capacity due to damage received during the war. Later this year the plant will be shut down for three months for a complete overhaul and repair. Afterwards it is expected to be able to operate at 80 percent of design capacity. Both plants use indigenous natural gas for raw material. The urea production we project from the two plants during the FYP is as follows:

TABLE 4

Urea Production During FYP by Fiscal Years
(in thousands of metric tons)

<u>Unit</u>	<u>1974</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
Fenchuganj	40	40	40	40	40
Ghorasal	<u>170</u>	<u>153</u>	<u>272</u>	<u>272</u>	<u>272</u>
TOTAL -	<u>210</u>	<u>193</u>	<u>312</u>	<u>312</u>	<u>312</u>

Neither of the two TSP plants have yet operated commercially. Unit I was badly damaged shortly after commissioning when rock phosphate containing too much chlorine was used. Unit II was ready for commissioning in March 1971 but, because of the disturbances that preceded the war, was not tested. Subsequent to the war it has not been started for lack of rock phosphate. No one can predict the speed at which the two TSP units will be brought into commercial production, and the output level they will achieve. We have projected the following production which we believe is obtainable:

TABLE 5

TSP Production during FYP by Fiscal Years
(in thousands of metric tons)

<u>Unit</u>	<u>1975</u>	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
Chittagong I	-	-	16	19	19
Chittagong II	-	17	72	96	96
TOTAL -	-	17	88	115	115

All raw materials needed for the manufacture of TSP are imported. To produce one MT of TSP requires two tons of rock phosphate and .7 MT of sulphur. Based on our projected TSP production the following raw materials will, therefore, be required:

TABLE 6

Raw Material Requirements for
TSP Production by Fiscal Years
(in thousands of metric tons)

	<u>1975</u>	<u>1976</u>	<u>1977</u>	<u>1978</u>
TSP Production	17	88	115	115
Rock Phosphate	34	176	230	230
Sulphur	11.9	61.6	80.5	80.5

14,000 MT of sulphur supplied under the Canadian aid program is now at the site. At the level of production projected, this quantity should last until July 1975. Allowing six months for procurement and shipping, the BDG should initiate arrangements for more sulphur in January 1975. It is expected that Canadian aid funds will be available

to purchase subsequent shipments of sulphur, but that expectation depends on future Canadian aid levels and availability and purchase of other commodities which can be obtained from Canada (copper, lead, zinc, aluminum).

A five-year agreement for the supply of rock phosphate has been arranged with a Moroccan Government firm. The agreement calls for the following deliveries which should meet the requirements of the project:

TABLE 7

Moroccan Rock Phosphate Supply Contract
(in thousands of metric tons)

	c a l e n d a r y e a r				
	1974	1975	1976	1977	1978
Quantity	110	170	180	200	220

The first 40,000 MT will be shipped by June 30, 1974 and are being financed by A.I.D. under the Relief and Rehabilitation Grant.

Import Needs

The following tables (TABLES 8, 9 and 10) show the extent to which requirements are likely to be met from domestic production, the imports currently contracted for, and the additional import requirements necessary.

TABLE 8

UREA
(in thousands of metric tons)

	(Bangladesh Fiscal Years)				
	1974	1975	1976	1977	1978
Opening Stock	88	60	-	-	-
Domestic Production	210	193	312	312	312
Contracted Imports					
Total Availability	298	253	312	312	312
Requirements	<u>238</u>	<u>326</u>	<u>392</u>	470	564
Closing Stock/Deficit	<u>60</u>	<u>(73)</u>	<u>(80)</u>	<u>(158)</u>	<u>(252)</u>

TABLE 9

	TSP (in thousands of metric tons)				
	(Bangladesh Fiscal Years)				
	1974	1975	1976	1977	1978
Opening Stock	48	13	-	-	-
Domestic Production	-	17	88	115	115
Contracted Imports	70	42	-	-	-
Total Availability	118	72	88	115	115
Requirements	105	126	151	181	217
Closing Stock/Deficit	<u>13</u>	<u>(54)</u>	<u>(63)</u>	<u>(66)</u>	<u>(102)</u>

TABLE 10

	MURIATE OF POTASH (in thousands of metric tons)				
	(Bangladesh Fiscal Years)				
	1974	1975	1976	1977	1978
Opening Stock	10	32	18	-	-
Domestic Production	-	-	-	-	-
Contracted Imports	42	10	-	-	-
Total Availability	52	42	18	-	-
Requirements	20	24	29	35	41
Closing Stock/Deficit	<u>32</u>	<u>18</u>	<u>(11)</u>	<u>(35)</u>	<u>(41)</u>

The value of the import requirements for finished fertilizers during fiscal year 1975^{1/} at today's market prices is about \$50 million. Purchases of rock phosphate for domestic manufacture of TSP under the Moroccan contract through June 30, 1975 will require additional funds of about \$14 million. The proposed loan would finance part of these imports.

^{1/} The Bangladesh Fiscal Year is July 1 to June 30 which roughly corresponds to the crop year commencing with the planting of the aman crop and ending with the harvesting of the boro crop.

Fertilizer Prices and Subsidies

Since independence Bangladesh has subsidized the price of fertilizer to the farmer as a method of popularizing its use. It has caused a substantial and increasing budgetary drain. The Government is aware of this problem and agrees with the repeated recommendations by advisors, consultants and donors that fertilizer should be sold at its real value as soon as possible. To this end Bangladesh has made great strides in the past year increasing some fertilizer prices by 200 percent. The increases have, however, not kept pace with the increased cost of imported fertilizer which in some cases has risen by more than 300 percent. The following table shows the Bangladesh farm prices of the three major fertilizers over the past three years.

TABLE 11

Fertilizer Prices to Farmer 1972-1974
(in takas per maund of product)

	1972	1973	1974	(April) 1974
Urea	10.12	20.00	30.00	50.00
TSP	10.02	14.50	20.00	40.00
Potash	6.37	10.00	15.00	30.00

Converting the maunds to tons and takas to U.S. dollars at a rate of TK. 7.5 to U.S. \$1.00, the current prices reflect the following subsidies:

TABLE 12

Fertilizer Prices and Subsidies
(in metric tons at U.S. dollars)

Product	Prices to Farmer	Cost		Subsidy	
		Imported*	Produced**	Imported	Produced
Urea	179	423	133	244	(46)
TSP	143	433	281	290	138
Potash	107	155		48	-

* Based on most recent prices and including \$50.00 MT for ocean transportation and \$33.00 MT for inland transportation.

** Based on current raw material prices and current low production level plus \$33.00 MT for inland transportation

At the projected level of fertilizer usage, the BDG subsidy program will translate into a budgetary cost of \$41.3 million in FY 1975 rising to \$94.6 million in FY 1978, assuming prices and subsidies are constant. Clearly the incentive to reduce the subsidy is present and we expect that the BDG will continue to reduce subsidies as it has in the past three years. The incentive to take this action is further enhanced by the recent increases in rice prices, which have risen by almost 100 percent.

III. Pesticides

The high-yielding varieties widely used in Bangladesh are not resistant to insect attack and rice diseases spread by insects. As high-yielding varieties spread, Bangladesh will become more vulnerable to serious rice crop losses caused by insects.

1971 crop losses in Bangladesh due to pests (particularly insects) were estimated at about three billion taka or \$400 million.^{1/} At the current price at the retail level, this is equivalent to a 840,000 MT loss of rice production.

The procurement, distribution and application of pesticides (particularly liquid insecticides) are handled poorly in Bangladesh. In the past A. I. D. has refused to finance liquid pesticides for Bangladesh because they are difficult to store, handle and distribute, require special equipment, such as sprayers, and demand some technical knowledge for proper application. Granular insecticides are relatively easy to handle, require no special equipment, and the farmer himself can apply the insecticide directly. Under the Relief and Rehabilitation Grant to Bangladesh, A. I. D. financed 3,000 MT of granular pesticides at a cost of \$2.6 million.

Tests have been performed using granular insecticides in Bangladesh. Both the IBRD Land and Water Resources Sector Study and the FAO/DANIDA Team Report consider the use of granulars to be especially effective for the boro crop, which uses improved, high-yielding variety seed. Appendix 8 of the above IBRD Study shows the expected yield per acre increases for high-yielding rice varieties, due to the application of 10 lbs. of granular pesticides, to be approximately 985 pounds. Granular pesticides are not appropriate, according to the FAO/DANIDA Report, for application in deeply flooded land (aman crop) or for aus crop seed beds.

The BDG has recognized that it has serious plant protection problems and it is taking the following actions:

- (1) A. I. D. has been asked to provide a team from the University of California to conduct an intensive study of all aspects of plant protection. A scope of work has been drafted and the team should commence work this summer.

I/ IBRD Land and Water Resources Study, Volume V, p. i.

- (2) New legislation is being prepared to provide control over the use of pesticides.
- (3) A new organization is being designed to replace several which are now involved in plant protection.
- (4) On April 1, 1974, the BDG formally announced the imposition of a charge for pesticides, which had previously been given to farmers free of cost.

Once the BDG has the recommendations of the University of California study in hand and the above in-house improvements are completed, the BDG will be in a position to plan and implement an effective plant protection program over the next five years.

In the meantime, the BDG estimates that 6,000 tons of pesticides will be required for the boro crop of FY 1975, and another 6,000 tons will be needed for the FY 1976 boro crop. By the end of the Five-Year Plan, Bangladesh will need 10,000 tons for the boro. If the recommended dosage of 10 pounds to the acre is used, 6,000 tons will cover 1.2 million acres. In FY 1973, IR-8 was planted on 1.1 million acres and we expect that the acreage will increase in FY 1974 and again in FY 1975. If we add the acreage planted in potatoes, total acreage suitable for the application of granular pesticides will certainly exceed the 1.2 million acres.

IV. The Loan

Purpose and Use

The purpose of this loan is to assist the Government of Bangladesh in acquiring part of the agricultural inputs necessary to increase foodgrain production by financing the foreign exchange costs of procuring, insuring and inspecting chemical fertilizers, fertilizer raw materials and granular pesticides required for one crop year beginning with the boro crop planed in November/December 1974 and ending with the aman crop planted in June/July 1975. The loan will succeed the Relief and Rehabilitation Grant under which funds have been allocated for 40,000 tons of rock phosphate and for fertilizers for the aman crop of June/July 1974.

As shown in Sections II and III, the finished fertilizer requirements for the crop year will be approximately 73,000 MT of urea and 54,000 MT of TSP; and the granular pesticide requirements will be approximately 6,000 MT. We propose that these items be eligible for financing under the loan. The actual allocation of funds between commodities will depend on the availability (both as to world market supply and the possibility of other donor financing) and can only be determined by subsequent events.

Raw material requirements for indigenous manufacture of TSP are rock phosphate and sulphur. Based on the projected production schedule, quantities on hand, or enroute, appear adequate. Considering, however, that indigenous production could exceed our projections, and the long lead time required to assure their arrival in Bangladesh, we propose that both raw materials be eligible for financing under this loan.

Relation of the Loan to A.I.D.'s Overall Program and Priorities

A.I.D.' has long been a primary source of funding for agricultural inputs. Out of the \$203 million Relief and Rehabilitation Grant, \$29.2 million has been allocated to finance fertilizer of which \$23.9 million has already been disbursed. An additional \$4.5 million has been allocated for 40,000 tons of rock phosphate. \$2.6 million has been allocated and disbursed for pesticides.

The development assistance program being formulated by A.I.D. and the BDG to succeed the rehabilitation program focuses sharply on the BDG's two primary goals, increased food production and increased employment. On the food production side, fertilizer and pesticides are two priority areas for concentration, both in terms of input supplies and the strengthening of the institutions which handle these inputs.

V. Economic Analysis

Fertilizer

(1) Increase in Yield by Crop

The table below gives the results of 2,719 experiments with the application of nitrogen, phosphorous and potassium, singly and in combination on local varieties. ^{1/} These experiments were conducted from 1957 to 1968. Test results on high yielding varieties (IR-8 and IR-20) have shown even higher response ratios. It is our intention to present the most conservative response ratios for the purposes of our analysis.

TABLE 1
Incremental Increase Yield per Acre by Crop
From the Application of N-P-K Singly and in Combinations
(Metric Tons)

N-P-K (Nutrient lbs/Acre)	Local Varieties					
	(Response)		(Response)		(Response)	
	Aus	(Ratio)	Aman	(Ratio)	Boro	(Ratio)
0-0-0	1150	(-)	1150	(-)	1150	(-)
40- 0- 0	1576	(10.6)	1610	(11.5)	1679	(13.2)
0-40- 0	1449	(7.5)	1472	(8.1)	1541	(9.8)
0- 0-40	1472	(8.1)	1449	(7.5)	1472	(8.1)
40-40- 0	1886	(9.2)	1805	(8.1)	1725	(7.2)
40-40-40	2208	(8.8)	2047	(7.5)	1863	(5.9)

Note: As nitrogen application rates are increased beyond 40 lbs/acre, phosphates must be added to fully utilize the added increments of nitrogen.

The following table compares the phosphate plant nutrient cost to the Bengali farmer with both the low and high sales price of paddy in Bangladesh. This comparison is made for a range of response ratios from 1:3 to 1:8; that is, the input of one MT of plant nutrient will yield from 3 to 8 additional MT's of rice. The response ratios would be higher for nitrogen (urea).

^{1/} Dr. A. Alim, An Introduction to Bangladesh Agriculture, p. 184
(Dr. Alim is the Director of Agriculture for Research and Education in the Bangladesh Ministry of Agriculture.)

TABLE 2

Cost Benefit Analysis Comparing Incremental Cost of Additional Phosphate Fertilizer Use to Incremental Value of Increased Rice Yield (in Metric Tons)

<u>Product to Yield Ratio</u>	<u>Subsidized Phosphate Plant Nutrient Cost</u>	<u>Value of Paddy</u>		<u>Cost Value Ratio</u>	
		<u>High (\$358)</u>	<u>Low (\$179)</u>	<u>High</u>	<u>Low</u>
1:3	\$310	\$1074	\$ 537	3.46	1.73
1:4	310	1432	716	4.62	2.31
1:5	310	1790	895	5.77	2.89
1:6	310	2148	1074	6.93	3.46
1:7	310	2506	1253	8.08	4.04
1:8	310	2864	1432	9.24	4.62

From the above table, it can be concluded that, even when a very low 1:3 product to yield ratio and a low value of paddy is used, it is financially beneficial to the farmer to use fertilizer. This table also shows that fertilizer prices can be increased to "full pricing" without seriously affecting the financial return to the farmer.

(3) Financing Fertilizer Versus Importing Wheat

The cost of wheat delivered upcountry in Bangladesh at today's prices is about \$240 MT (\$190, CIF Chittagong plus inland transportation). On the other hand, the application of one pound of fertilizer plant nutrient should, on the average, increase the yield of rice by at least 7 lbs. The cost of fertilizer delivered at the farm gate is \$433 MT for TSP. The cost of a plant nutrient ton of fertilizer is thus \$940. As can be seen from Table 1 in this section, the lowest response ratio is 1:5.9. Stated another way, an investment of \$940 for a ton of phosphate plant nutrient will produce an additional 5.9 MT's of rice. An investment of \$940 will only procure 3.9 tons of wheat (\$940 ÷ 240). The benefit to Bangladesh of importing fertilizer rather than wheat is obvious.

Locally Producing Versus Importing TSP

Two metric tons of rock phosphate and .7 metric tons of sulphur are the raw materials required to produce one metric ton of TSP. The current C&F cost for rock phosphate and sulphur is \$80.00 MT \$40.00 MT respectively; which is to say that a \$188.00 MT cost of raw materials is required to produce a metric ton of TSP. Other costs are approximately \$59.00 MT, which means that a locally produced MT of TSP will cost the BDG \$247.00 (\$188.00 plus \$59.00).

Imported TSP currently costs \$400.00 C&F, (\$350.00 commodity cost plus \$50.00 ocean freight). Consequently, it makes good economic sense for Bangladesh to import rock phosphate and sulphur, as long as the TSP world market price is above \$250 MT.

Granular Pesticides

The IBRD Land and Water Resources Sector Study concludes that the average increase in yield by using 10 lbs of granular insecticide per acre on a high yielding variety (IR-20 or IR-6) would be approximately 985 lbs. The cost of 10 lbs. of granular insecticide, at \$1,200/MT, would be about \$5.44. The value of the increased paddy production (985 lbs) would be \$80.00, using a low value of paddy of \$179/MT. Even if the price of paddy dropped in half, the product yield ratio would be 1:7.3, a tremendous return on the farmer's investment.

VI. Implementation

Procurement

The worldwide shortage of fertilizers makes it difficult to ensure that the BDG will be able to procure all that it requires. Further, A.I.D. funds cannot be used to finance fertilizer shipments from North America during the period February 1st through May 31st. In light of this, we propose that the BDG be permitted to: a) negotiate directly with eligible Geographic Code 899 suppliers, (b) float a formal tender in the United States, or c) enter into a purchase contract as the result of a worldwide fertilizer tender being floated by A.I.D. Formal competitive tendering procedures will be required for the procurement of pesticides, since comparable granular pesticides are offered by several U.S. manufacturers.

Contracts awarded on the basis of a formal IFB will be financed directly, utilizing the Letter of Commitment procedure. Contracts negotiated informally by the BDG or entered into as a result of the A.I.D. worldwide tender will be financed on a reimbursable basis, if A.I.D. requirements are satisfactorily met (e.g., price, source-origin, shipping, etc.).

Implementing Agencies

The BADC will be responsible for procuring fertilizers and pesticides, except as recommended in Section C below when the BD Embassy is authorized to handle procurement. The BADC will be responsible for distribution of fertilizer to the thana level and pesticides to the district level. Fertilizer raw materials are handled by the Bangladesh Fertilizer Chemical and Pharmaceutical Corporation, a wholly-owned Government corporation, which manages the four indigenous fertilizer plants.

Monitoring and Reporting

All inputs procured by formal tender and financed by Letters of Commitment will be handled by the BDG Embassy in Washington. AID/Washington will assist the Embassy. Procurement of inputs purchased with the BDG's own foreign exchange for which reimbursement will be sought, will be largely monitored by USAID. USAID will provide guidance on A.I.D. regulations applicable to reimbursable financing and will receive and review reimbursement requests and supporting documents.

The Commodity Logistics Office of USAID will assume monitoring responsibilities for the agricultural inputs imported under this loan.

Reporting systems for fertilizers, pesticides and rock phosphate have been developed and used in conjunction with Rehabilitation Grant financing of these items. The report formats were worked out with the BDG implementing agencies and have been refined over the past two years. The initial implementation letter of this proposed loan will contain the same reporting requirements as are now included in Rehabilitation Grants Implementation Letters.

Terminal Dates

The Terminal Dates for Requesting Letters of Commitment and for Disbursements will be June 30, 1975 and December 31, 1975 respectively.

Eligibility Date

Based on Bangladesh's current requirements for TSP, 25,000 MT of fertilizer should be purchased within the June-July 1974 period in order for the fertilizer to be shipped in September 1974 and distributed in Bangladesh during October-November 1974. Therefore, the eligibility date for financing agricultural inputs under this loan will be June 1, 1974, although the Loan Agreement will be executed subsequent to June 1, 1974.

VII. Debt Servicing Capacity

An assessment of Bangladesh's external debt position leads us to the conclusion that Bangladesh can support additional foreign debt.

The Bangladesh Government is currently engaged in negotiating the assumption of a portion of the foreign debts contracted by the former Government of Pakistan. Recently the Government of Bangladesh agreed in principle to accept liability for projects visibly located in Bangladesh. The U.S.-GOP project assistance involved is approximately \$65 million. It is very likely that this debt service burden, and that for other donors, will be generously rescheduled. It is therefore expected that the burden of the pre-independence debt will not claim a share of the country's foreign exchange earnings until the early 1980's.

Two-thirds of the \$1.5 billion of assistance provided to Bangladesh between independence and November 1973 has been in the form of grants. The present burden of loans and other credits (which total about \$570 million) is about \$23 million a year or 6 percent of export earnings. All U.S. assistance in FY 1972 and 1973 has been in the form of grants. The first USG loans (in the form of \$48 million in PL 480 Title I sales) were made in FY 1974. This Agricultural Inputs Loan is the first A.I.D. Development Loan to Bangladesh.

In FY 1974, Bangladesh exports are estimated at about \$350 to \$375 million, while imports are estimated at \$700 million. It should be noted that the increase in the CY 1974 import bill caused by soaring food, P.O.L. and fertilizer prices is about \$100 million. The gap is being covered by disbursements from foreign aid, short-term borrowing and drawdowns on reserves.

The recent Five-Year Plan stresses foodgrain self-sufficiency to end reliance upon costly food imports, and an aggressive jute export policy. Both priorities should ensure adequate foreign exchange to keep the debt service burden well below 20 percent of foreign exchange earnings per year. It appears, therefore, that the prospects for repayment of this \$25 million loan are reasonable.

VIII. Environmental Considerations

Fertilizers are inorganic compounds and, at the level of usage projected for the period of the FYP, will present no environmental problems in Bangladesh.

Granular pesticides, financed under the Relief and Rehabilitation Grant No. 1, are low in toxicity and there is no evidence to date that the use of an additional 6,000 MT will have any adverse effect on the environment. This has also been true of other Asian nations sharing the same climatic conditions (e.g., India), whose use of granular pesticides is substantial. However, a long-range pest control plan should certainly consider the effects of large quantities of pesticides for an extended time on the environment. The University of California study (see Annex E) will examine the environmental aspects of pesticides and provide a program plan to control spoilage of the environment.

Rock phosphate used in the manufacture of TSP will contain 3 percent to 4 percent fluorine and about 25 percent of this passes to the vapor lines of the reaction and evaporation sections. These gaseous effluents are washed with water in scrubbers before release to the atmosphere to remove gaseous fluorides. Other vapors released into the atmosphere are harmless.

LOAN AUTHORIZATION

Provided from: Food and Nutrition Funds
Bangladesh - Agricultural Inputs

Pursuant to the authority vested in the Administrator of the Agency for International Development ("A.I.D.") by the Foreign Assistance Act of 1961, as amended, and the Delegations of Authority issued thereunder, I hereby authorize the establishment of a loan ("The Loan") pursuant to Part I, Chapter 1, Section 103, Food and Nutrition, and Part I, Chapter 2, Title 1, the Development Loan Fund, to The Peoples' Republic of Bangladesh ("The Government") of not to exceed Twenty Five Million Dollars (\$25,000,000), such funds to be made available to the Government to assist in financing the foreign exchange costs of procuring fertilizers, fertilizer raw materials, granular pesticides and other agricultural inputs.

This Loan will be subject to the following terms and conditions:

1. Terms of Repayment and Interest Rate

The Loan shall be repaid by the Government within forty (40) years after the date of the first disbursement thereunder, including a grace period of not to exceed ten (10) years from the date of first disbursement. The interest on the outstanding balance of the Loan, including any due and unpaid interest thereon, shall

accrue from the date of the first disbursement at the rate of two percent (2%) per annum during the grace period and at the rate of three percent (3%) per annum thereafter.

2. Currency of Repayment

Provision shall be made for repayment of the Loan and for payment of the interest in United States Dollars.

3. Other Terms and Conditions

- a) Unless A.I.D. otherwise agrees in writing equipment, materials and services financed under the loan shall have their source and origin in Bangladesh and countries included in A.I.D. Geographic Code 941;
- b) The Loan shall be subject to such other terms and conditions as A.I.D. may deem advisable.

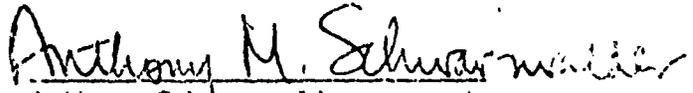
ANNEX B

AGRICULTURAL INPUTS
LOAN NO.

CERTIFICATION PURSUANT TO SECTION 611(e) OF THE
FOREIGN ASSISTANCE ACT OF 1961, AS AMENDED

I, Anthony Schwarzwald, Coordinator, the principal officer of the Agency for International Development in Bangladesh, having taken into account, among other things, the capacity of the Bangladesh Government and its agencies to properly utilize the agricultural inputs being imported under this loan, do hereby certify that in my judgment Bangladesh has the capability and human resources to effectively utilize these agricultural inputs.

This judgment is based upon considerations discussed in the loan paper to which this certification is attached.


Anthony Schwarzwald
Coordinator

CHECKLIST OF STATUTORY CRITERIA

BASIC AUTHORITY

1. FAA Sections 103, 104, 105, 106 and 107. Is Loan being made

(a) for agriculture, rural development or nutrition;

The loan is being made to help Bangladesh improve agriculture, rural development and nutrition by financing fertilizers, raw material for manufacturing fertilizers, and pesticides. It will contribute directly to increasing foodgrain yields and reducing losses due to pest attacks.

(b) for population planning or health;

Not applicable

(c) for education, public administration; or human resources development;

Not applicable

(d) to solve economic and social development problems in fields such as transportation, power, industry, urban development, and export development;

Not applicable

(e) in support of the general economy of the recipient country or for development programs conducted by private or international organizations.

Not applicable

COUNTRY PERFORMANCE

Progress Towards Country Goals

2. FAA Sections 201(b)(5), (7) and (8); 208.

A. Describe extent to which country is:

(1) Making appropriate efforts to increase food production and improve means for food storage and distribution.

Increasing foodgrain production is one of the major objectives of the Bangladesh Five-Year Development Plan (FYP). Rice production targets show increase of 34 percent during the FYP. Included in FYP are programs for storage and marketing of food. Despite

(2) Creating a favorable climate for foreign and domestic private enterprise and investment.

budget costs forced up by soaring import costs, major agricultural development programs are moving forward essentially intact.

The BDG official policy is to encourage foreign private enterprise and investment, although the policy contains some restrictions which has thus far limited investment from these quarters.

(3) Increasing the public's role in the developmental process.

Implementation of Bangladesh's development plans require increasing the public's role in development. A key rural development program involves the use of two tier cooperatives with elected officers as a means of involving the populace in development as well as extending information on upgrading agricultural and provision of credit. The rural works program also requires a high degree of local decision-making and participation.

(4) (a) Allocating available budgetary resources to development.

Bangladesh's budgetary resources are overwhelmingly allocated to relief, reconstruction, rehabilitation and development expenditures.

(b) Diverting such resources for unnecessary military expenditure (See also Item No. 20) and intervention in affairs of other free and independent nations.)
(See also Item No. 11)

Bangladesh's military expenditures are low and the country concentrates all its energies on domestic concerns.

(5) Making economic, social and political reforms such as tax collection improvements and changes in land tenure arrangements, and making progress toward respect for the rule of law, freedom of expression and of the press, and recognizing the importance of individual freedom, initiative, and private enterprise.

Bangladesh is a nation of small landowners with a landholding system more equitable than most LDC's. Although independent for only two years, the Government has written a constitution, held parliamentary elections and had its first local elections. The countryside is still rather unsettled after the war, and the Government has recently been taking actions to improve law and order.

(6) Willing to contribute funds to the project or program.

The Bangladesh Government will contribute towards the local costs of distributing the fertilizers and pesticides as well as the costs of processing the raw materials into fertilizers.

(7) Otherwise responding to the vital economic, political, and social concerns of its people, and demonstrating a clear determination to take effective self-help measures.

The Bangladesh Government is responding to the vital economic, political and social concerns of its people. It has a firm determination to come to grips with the appalling economic problems facing Bangladesh and take action.

B. Are above factors taken into account in the furnishing of the subject assistance? Yes

Treatment of U.S. Citizens and firms

3. FAA Section 620(c). If assistance is to government, is the government liable as debtor or unconditional guarantor on any debt to a U.S. citizen for goods or services furnished or ordered where (a) such citizen has exhausted available legal remedies and (b) debt is not denied or contested by such government?

At the present time the BDG is not known to be in violation of the requirements of this section.

4. FAA Section 620(e)(1). If assistance is to a government, has it (including government agencies or subdivisions) taken any action which has the effect of nationalizing, appropriating, or otherwise seizing ownership or control of property of U.S. citizens or entities beneficially owned by them without taking steps to discharge its obligations toward such citizens or entities?

At the present time the BDG is not known to be in violation of the requirements of this section.

5. FAA Section 620(o); Fishermen's Protective Act, Section 5. If country has seized, or imposed any penalty or sanction against, any U.S. fishing vessel on account of its fishing activities in international waters,

The BDG has not taken such action.

(a) has any deduction required by Fisherman's Protective Act been made? Not applicable

(b) has complete denial of assistance been considered by A.I.D. Administrator? Not applicable

Relations with U.S. Government and
Other Nations

6. FAA Section 620(a). Does recipient country furnish assistance to Cuba or fail to take appropriate steps to prevent ships or aircraft under its flag from carrying cargoes to or from Cuba? We are not aware of any BDG non-compliance with this provision.
7. FAA Section 620(b). If assistance is to a government, has the Secretary of State determined that it is not controlled by the international Communist movement? The Secretary of State has determined that the BDG is not controlled by the International Communist movement.
8. FAA Section 620(d). If assistance is for any productive enterprise which will compete in the United States with United States enterprise, is there an agreement by the recipient country to prevent export to the United States of more than 20 per cent of the enterprise's annual production during the life of the loan? Not applicable
9. FAA Section 620(f). Is recipient country a Communist country? No
10. FAA Section 620(i). Is recipient country in any way involved in (a) subversion of, or military oppression against, the United States or any country receiving U.S. assistance, or (b) the planning of such subversion or aggression? (a) No (b) No
11. FAA Section 620(j). Has the country permitted, or failed to take adequate measures to prevent, the damage or destruction, by mob action, of U.S. property? No
12. FAA Section 620(l). If the country has failed to institute the investment guaranty program for the specific risks of expropriation, in convertibility or confiscation, has the A.I.D. administration within the past year considered denying assistance to such government for this reason? Bangladesh is a newly independent country which has not yet instituted such a program. However, a draft OPIC bilateral agreement has been submitted to the BDG and the BDG has expressed strong interest in establishing this program. Thus the A.I.D. Administration has not considered denying assistance for this reason.
13. FAA Section 620(n). Does recipient country furnish goods to North Viet-Nam or permit ships or aircraft under its flag to carry cargoes to or from North Viet-Nam? We are not aware of any BDG non-compliance with this section.

14. FAA Section 620(a). Is the government of the recipient country in default on interest or principal of any A.I.D. loan to the country? No
15. FAA Section 620(t). Has the country severed diplomatic relations with the United States? If so, have they been resumed and have new bilateral assistance agreements been negotiated and entered into since such resumption? No, not applicable.
16. FAA Section 620(u). What is the payment status of the country's U.N. obligations? If the country is in arrears, were such arrearages taken into account by the A.I.D. Administrator in determining the current A.I.D. Operational Year Budget? The BDG has not as of yet been accepted as a member of the United Nations.
17. FAA Section 481. Has the government of recipient country failed to take adequate steps to prevent narcotic drugs and other controlled substances (as defined by the Comprehensive Drug Abuse Prevention and Control Act of 1970) produced or processed, in whole or in part, in such country, or transported through such country, from being sold illegally within the jurisdiction of such country to U.S. Government personnel or their dependents, or from entering the U.S. unlawfully? No
18. FAA, 1973 Section 29. If (a) military base is located in recipient country, and was constructed or is being maintained or operated with funds furnished by U.S. and (b) U.S. personnel carry out military operations from such base, has the President determined that the government of recipient country has authorized regular access to U.S. correspondents to such base? There is no such military base in Bangladesh.

Military Expenditures

19. FAA Section 620(s). What percentage of country budget is for military expenditures? How much of foreign exchange resources spent on military? There are no considerations under section 620(s) which would prohibit assistance to Bangladesh. Bangladesh's military expenditures are low, probably

equipment? How much spent for the purchase of sophisticated weapons systems? (Consideration of these points is to be coordinated with the Bureau for Program and Policy Coordination, Regional Coordinators and Military Assistance Staff (FPC/RC.)

among the lowest of all IDC's by any standard. The Soviet Union has provided a limited amount of aircraft for Bangladesh in 1966. This equipment is purchased on credit at below "market prices." The country is not diverting development assistance to military expenditures.

CONDITIONS OF THE LOAN

General Soundness

- | | |
|---|--|
| 20. <u>FAA Section 201(d)</u> . Information and conclusion on reasonableness and legality (under laws of country and the United States) of lending and relending terms of the loan. | Bangladesh is a relatively less developed country. The loan terms are 2 percent during a ten-year grace period and 3 percent for the balance of the 40-year repayment period. This is the minimum rate required by United States law and is a legal interest rate in Bangladesh. |
| 21. <u>FAA Sections 201(b)(2); 201(e)</u> Information and conclusion on activity's economic and technical soundness. If loan is not made pursuant to a multilateral plan, and the amount of the loan exceeds \$100,000, has country submitted to A.I.D. on application for such funds together with assurances to indicate that funds will be used in an economically and technically sound manner? | Yes |
| 22. <u>FAA Section 201(b)(2)</u> . Information and conclusion on capacity of the country to repay the loan, including reasonableness of repayment prospects. | See Section VII of Loan Paper. |
| 23. <u>FAA Section 201(b)(1)</u> . Information and conclusion on availability of financing from other free-world sources, including private sources within the United States. | No other U.S. source of finance is available for this loan: To the extent possible, other assistance donors are helping to meet Bangladesh's requirements for Agricultural inputs. |
| 24. <u>FAA Section 611(a)(1)</u> . Prior to signing of loan will there be (a) engineering, financial, and other plans necessary to carry out the | (a) Financial and other plans necessary to carry out the assistance are completed. |

assistance and (b) a reasonably firm estimate of the cost to the United States of the assistance?

(b) the cost of assistance to the United States is limited to the amount of the loan.

25. FAA Section 611(a)(2). If further legislative action is required within recipient country, what is basis for reasonable expectation that such action will be completed in time to permit orderly accomplishment of purpose of loan?

No such legislative action is required.

26. FAA Section 611(c). If loan is for Capital Assistance, and all U.S. assistance to project now exceeds \$1 million, has Mission Director certified the country's capability effectively to maintain and utilize the project?

Yes. See Annex B to the Loan Paper.

Loan's Relationship to Achievement of Country and Regional Goals

27. FAA Sections 207; 113

Extent to which assistance reflects appropriate emphasis on: (a) encouraging development of democratic, economic, political, and social institutions; (b) self-help in meeting the country's food needs; (c) improving availability of trained manpower in the country; (d) programs designed to meet the country's health needs; (e) other important areas of economic, political, and social development, including industry; free labor unions, cooperatives, and Voluntary Agencies; transportation and communication; planning and public administration; urban development, and modernization of existing laws; or (f) integrating women into the recipient country's national economy.

The loan has the indirect effect of encouraging institutional development for distribution of agricultural inputs and rural development and contributes directly towards meeting Bangladesh's foodgrain needs. The loan is not directed toward improving availability of trained manpower. Increased food availabilities are necessary to improved health. The loan will help cooperatives meet member's fertilizer requirements. The loan has no direct impact on integrating women into the economy.

28. FAA Section 209. Is project susceptible of execution as part of regional project? If so why is project not so executed?

No. The project is not so susceptible.

29. FAA Section 201(b)(4). Information and conclusion on activity's relationship to, and consistency with, other development activities, and

The loan is fully consistent with major objectives of the Bangladesh Five Year Development Plan in increasing foodgrain production,

its contribution to realizable long-range objectives.

which requires increases in yields and cropping intensities. It is also consistent with U.S. objectives in increasing agricultural production and rural development. See loan paper, Section I of the CAP for additional discussion.

30. FAA Section 201(b)(9). Information and conclusion on whether or not the activity to be financed will contribute to the achievement of self-sustaining growth.
- The activity will definitely contribute towards the development of the rural economy and increased food production, without which self-sustaining growth in Bangladesh is impossible.
31. FAA Section 209; Information and conclusion whether assistance will encourage regional development programs.
- Not applicable. This is not a goal of this Loan.
32. FAA Section 111. Discuss the extent to which the loan will strengthen the participation of the urban and rural poor in their country's development, and will assist in the development of cooperatives which will enable and encourage greater numbers of poor people to help themselves toward a better life.
- By increasing the availability of fertilizers and pesticides, small farmers will be able to increase food production and income. An increasing share of the agricultural inputs will be channelled through the equivalent of county wide cooperative federations of village level primary cooperatives.
33. FAA Section 201(f). If this is a project loan, describe how such project will promote the country's economic development taking into account the country's human and material resource requirements and the relationship between ultimate objectives of the project and overall economic development.
- Increased agricultural production is essential to Bangladesh's economic development. In order to increase production and foodgrain yield per acre, increased quantities and timely availabilities of agricultural inputs such as fertilizers and pesticides are required.
34. FAA Section 281(a). Describe extent to which the loan will contribute to the objective of assuring maximum participation in the task of economic development on the part of the people of the country, through the encouragement of democratic, private, and local governmental institutions.
- Agricultural Inputs are required for implementation of the BDG's agricultural and rural development strategy, since they facilitate obtaining increased food yields. The strategy is based upon the development of the two tiered cooperative system, which stresses participation of the rural populace.
35. FAA Section 281(b). Describe extent to which program recognizes the particular needs, desires, and capacities of the people of the country;
- The loan has relationship, (see above) to the rural development program stressing the two tiered cooperatives. These coops require

utilizes the country's intellectual resources to encourage institutional development; and supports civic education and training in skills required for effective participation in governmental and political processes essential to self-government.

considerable participation by the local population if they are to be successful. The managing committees at village and Thana (county) federation level are elected. In addition, the cooperatives will be involved in the distribution of fertilizer, and will provide loans to farmers for purchase of fertilizer.

36. FAA Section 201(b)(3). In what ways does the activity give reasonable promise of contributing to the development of economic resources, or to the increase of productive capacities?

The project contributes directly to increasing agricultural production and indirectly to other aspects of rural development.

37. FAA Section 601(a). Information and conclusions whether loan will encourage efforts of the country to: (a) increase the flow of international trade; (b) foster private initiative and competition; (c) encourage development and use of cooperatives, credit unions, and savings and loan associations; (d) discourage monopolistic practices; (e) improve technical efficiency of industry, agriculture, and commerce; and (f) strengthen free labor unions.

The loan will increase foreign trade, since the commodities will be additional to what Bangladesh would otherwise finance. Since private licensed sellers distribute fertilizer, it will facilitate private initiative of traders as well as farmers. It does help cooperative development, since coops are involved in distribution of fertilizer and will provide credit for purchase of agricultural inputs. Such inputs do improve the technical efficiency of agriculture sector. The loan is not directed toward strengthening free labor unions.

38. FAA Section 619. If assistance is for newly independent country; if it furnished through multilateral organizations or plans to the maximum extent appropriate?

Although Bangladesh is a newly independent country, it is not appropriate to so furnish this assistance since this loan is intended to be addition to assistance already being channelled through multilateral organizations. IBRD will probably become the largest single such donor.

Loan's Effect on U.S. and A.I.D. Program

39. FAA Section 201(b)(6). Information and conclusion on possible effects of loan on U.S. economy, with special reference to areas of substantial labor surplus, and extent to which U.S. commodities and assistance are furnished in a manner consistent with improving the U.S. balance of payments position.

Depending on the supply of fertilizer the loan will attempt to finance commodities substantially of U.S. source and origin. The loan should have no adverse effects on the U.S. economy. No information can be developed as to whether any specific labor surplus will be benefited.

40. FAA Section 202(a). Total amount of money under loan which is going directly to private enterprise, is going to intermediate credit institutions or other borrowers for use by private enterprise, is being used to finance imports from private sources, or is otherwise being used to finance procurements from private sources.
- The loan will finance the procurement of fertilizer, fertilizer raw material and pesticides. Generally, firms supplying these items will be private.
41. FAA Section 601(b). Information and conclusion on how the loan will encourage U.S. private trade and investment abroad and how it will encourage private U.S. participation in foreign assistance programs (including use of private trade channels and the services of U.S. private enterprise).
- The loan will finance and encourage the export of U.S. commodities to Bangladesh.
42. FAA Section 601(d). If a capital project, are engineering and professional services of U.S. firms and their affiliates used to the maximum extent consistent with the national interest?
- Not applicable
43. FAA Section 602. Information and conclusion whether U.S. small business will participate equitably in the furnishing of goods and services financed by the loan.
- Normal Small Business notification will be required in the implementation of the loan.
44. FAA Section 620(h). Will the loan promote or assist the foreign aid projects or activities of the Communist-Bloc countries?
- No.
45. FAA Section 621. If Technical Assistance is financed by the loan, information and conclusion whether such assistance will be furnished to the fullest extent practicable as goods and professional and other services from private enterprise on a contract basis. If the facilities of other Federal agencies will be utilized, information and conclusion on whether they are particularly suitable, are not competitive with private enterprise, and can be made available without undue interference with domestic programs.
- The loan will not finance technical assistance.

Loan's Compliance with Specific Requirements

46. FAA Sections 110(a); 208(e). In what manner has or will the recipient country provide assurances that it will provide at least 25 percent of the costs of the program, project, or activity with respect to which the Loan is to be made? Considerably more than 25 percent of the costs of the program to which this loan contributes will be met by Bangladesh. Bangladesh will pay all costs of inland transport (probably by 25 percent a.i.d. cost) of imported fertilizers, the processing and distribution costs for domestic TSP and the entire cost (including raw materials) of manufacturing and distributing urea. In addition the BDG will handle and distribute the granular pesticides and will obtain liquid pesticides.
47. FAA Section 112. Will loan be used to finance police training or related program in recipient country? The loan will not be used for such purpose.
48. FAA Section 114. Will loan be used to pay for performance of abortions or to motivate or coerce persons to practice abortions? No.
49. FAA Section 201(b). Is the country among the 20 countries in which development loan funds may be used to make loans in this fiscal year? Yes
50. FAA Section 201(d). Is interest rate of loan at least 2 percent per annum during grace period and at least 3 percent per annum thereafter? Yes, the Loan Agreement shall so provide.
51. FAA Section 201(f). If this is a project loan, what provisions have been made for appropriate participation by the recipient country's private enterprise? Private licensed sellers will distribute the fertilizer inputs, which will facilitate private enterprise.
52. FAA Section 604(a). Will all commodity procurement financed under the loan be from the United States except as otherwise determined by the President? All commodity imports except fertilizer under the loan will be from A.I.D. Geographic Code 341 countries, unless otherwise agreed to by A.I.D. In keeping with the A.I.D. Administrator's Waiver for fertilizer, such procurement will be from A.I.D. Geographic Code 899.

53. FAA Section 604(b). What provision is made to prevent financing commodity procurement in bulk at prices higher than adjusted U.S. market price? The implementation of the loan agreement will prohibit loan funds to be used for such financing.
54. FAA Section 604(d). If the cooperating country discriminates against U.S. marine insurance companies, will loan agreement require that marine insurance be placed in the United States on commodities financed by the loan? Yes, the Loan Agreement shall so provide.
55. FAA Section 604(e). If offshore procurement of agricultural commodity or product is to be financed, is there provision against such procurement when the domestic price of such commodity is less than parity? All prices for agricultural inputs will be reviewed by the A.I.D. Commodity Management Division.
56. FAA Section 604(f). If loan finances a commodity import program, will arrangements be made for supplier certification by A.I.D. and A.I.D. approval of commodity as eligible and suitable? Yes.
57. FAA Section 608(a). Information on measures to be taken to utilize U.S. Government excess personal property in lieu of the procurement of new items. Not applicable
58. FAA Section 611(b); App. Sec. 101. If loan finances water or water-related land resources construction project or program, is there a benefit-cost computation made, insofar as practicable, in accordance with the procedures set forth in the Memorandum of the President dated May 15, 1962? Not applicable
59. FAA Section 611(c). If contracts for construction are to be financed, what provision will be made that they be let on a competition basis to maximum extent practicable? Not applicable
60. FAA Section 612(b); Sec. 636(h). Describe steps taken to assure that, to the maximum extent possible, the country is contributing local currencies to meet the cost of The U.S. does not own a significant amount of Bangladesh taka, which could be used in this project. The Bangladesh Government will contribute the small amount.

- contractual and other services, and foreign currencies owned by the United States are utilized to meet the cost of contractual and other services.
61. App. Section 113. Will any of loan funds be used to acquire currency of recipient country from non-U.S. Treasury sources when excess currency of that country is on deposit in U.S. Treasury? No. Bangladesh is not an excess currency country.
62. Section 30 and 31 of PL 93-189 (FAA of 1973). Will any part of the loan be used to finance directly or indirectly military or paramilitary operations by the U.S. or by foreign forces in or over Laos, Cambodia, North Vietnam, South Vietnam, or Thailand? No.
63. Section 37 of PL 93 - 189 (FAA of 1973); App. Section 111. Will any part of this loan be used to aid or assist generally or in the reconstruction of North Vietnam? No.
64. FAA Section 612(d). Does the United States own excess foreign currency and, if so, what arrangements have been made for its release? See para 60 above.
65. FAA Section 620(g). What provision is there against use of subject assistance to compensate owners for expropriated or nationalized property? The loan will not be used for this purpose, but only for purchase of agricultural inputs and raw materials.
66. FAA Section 620(k). If construction of productive enterprise, will aggregate value of assistance to be furnished by the United States exceed \$100 million? Not applicable
67. FAA Section 636(i). Will any loan funds be used to finance purchase, long-term lease, or exchange of motor vehicle manufactured outside the United States, or any guaranty of such a transaction? This loan will not finance the procurement of motor vehicles.
68. App. Section 103. Will any loan funds be used to pay pensions, etc., for military personnel? No.

69. App. Section 105. If loan is for capital project, is there provision for A.I.D. approval of all contractors and contract terms? Not applicable
70. App. Section 107. Will any loan funds be used to pay UN assessments? No
71. App. Section 109. Compliance with regulations on employment of U.S. and local personnel. (A.I.D. Regulation 7). The Loan does not finance any personnel costs.
72. App. Section 110. Will any of loan funds be used to carry out provisions of FAA Section 209(d)? No.
73. App. Section 112. Will any of the funds appropriated or local currencies generated as a result of A.I.D. assistance be used for support of police or prison construction and administration in South Vietnam or for support of police training of South Vietnamese? No.
74. App. Section 114. Describe how the Committee on Appropriations of the Senate and House have been or will be notified concerning the activity, program, project, country, or other operation to be financed by the Loan. The Loan was included in the FY 1974 Congressional Presentation.
75. App. Section 601. Will any loan funds be used for publicity or propoganda purposes within the United States not authorized by Congress? No
76. App. Section 604. Will any of the funds appropriated for this project be used to furnish petroleum fuels produced in the continental United States to Southeast Asia for use by non-U.S. nationals? No.
77. MMA Section 901.b; FAA Section 640C.
 (a) Compliance with requirement that at least 50 per centum of the gross tonnage of commodities (computed separately for dry bulk carriers, dry cargo liners, and tankers) financed with funds made available under this loan shall be transported on privately owned U.S. flag commercial vessels to Yes, the Loan Agreement shall contain such a requirement.

the extent that such vessels are available at fair and reasonable rates.

(b) Will grant be made to loan recipient to pay all or any portion of such differential as may exist between U.S. and foreign-flag vessel rates?

None is contemplated at this time.

ANNEX B

AGRICULTURAL INPUTS
LOAN NO.

CERTIFICATION PURSUANT TO SECTION 611(e) OF THE
FOREIGN ASSISTANCE ACT OF 1961, AS AMENDED

I, Anthony Schwarzwald, Coordinator, the principal officer of the Agency for International Development in Bangladesh, having taken into account, among other things, the capacity of the Bangladesh Government and its agencies to properly utilize the agricultural inputs being imported under this loan, do hereby certify that in my judgment Bangladesh has the capability and human resources to effectively utilize these agricultural inputs.

This judgment is based upon considerations discussed in the loan paper to which this certification is attached.


Anthony M. Schwarzwald
Anthony Schwarzwald
Coordinator

TVA: Description of Scope of Technical Services

A team consisting of four TVA and an equal number of Bangladesh technicians will:

1. Review available agronomic data to determine the adequacy of present fertilizer recommendations by crops and regions.
2. Make fertilizer use estimates by crop, region and by season of demand (irrigated and non-irrigated) for five and ten year periods and provide methodology for updating annually.
3. Recommend kinds and quantities of fertilizer (urea, straight phosphates, N-P, N-P-K, and possible micro-nutrients) best suited to Bangladesh agriculture.
4. Evaluate the possible use of rock phosphate in Bangladesh agriculture and crops in which it could be used and the price at which it could replace TSP or other manufactured phosphates.
5. Recommend possible needs for liming materials or other amendments and how needs can be satisfied.
6. Produce regional fertilizer needs (total and by kind) and recommend date of arrival at regional godowns, so that fertilizers will be available for moving through the system on a timely basis. In order to assess future transportation requirements, the study will make recommendations concerning not only the areas of fertilizer usage but also the points within the country from where the fertilizer will be supplied whether locally manufactured or imported. Provide a methodology for updating this annually.

7. Review and estimate a local fertilizer production capability. Recommend kinds and amounts of fertilizer that should be produced in Bangladesh over the years ahead.
8. Recommend import needs (amounts and kinds) to supplement local production and better serve agricultural needs. Suggest tendering procedures and import schedules.
9. Evaluate the potential for bulk handling for imported and locally produced fertilizers and provide guidance on types of equipment and handling facilities needed. Advise on most suitable size and type bags for transport and delivery of fertilizer (especially urea) under the conditions prevailing in Bangladesh.
10. Study present storage facilities and plans for expansion as to adequacy and in light of good inventory management.
11. Provide guidance on how present production can be utilized to provide fertilizer needs and suggest alterations of existing facilities to contribute to meeting this need.
12. Determine probable value/cost ratios and utilize these to derive priorities for fertilizer use in a sellers market situation and as a guide for the reduction or elimination of subsidies.
13. Study the present pricing and subsidy policies and suggest future policies.
14. Study the present credit system to ascertain effect on fertilizer sale and suggest improvements based on estimated future requirements.

15. Utilize data generated by the transport survey and build on this, provide a transport strategy and system for fertilizer, identifying where possible, specific projects required to meet transport system objectives.

16. Describe, evaluate and recommend improvement in overall distribution and marketing system for fertilizers in Bangladesh.

17. Study the method of appointment and regulation of fertilizer distributors, wholesalers and retailers. Comment on past effectiveness, adequacy and suitability of marketing structure at Thana level and below, along with its commercial effectiveness. Identify weaknesses and propose options to the government.

18. Observe workings of fertilizer retailing system at farm level and the extent of farmer education, demonstration or other training program. Identify weaknesses and propose options to the government.

19. Evaluate present research, extension and training efforts and suggest further training in the U.S., other countries and Bangladesh that will be beneficial.

20. Work with the Fertilizer Corporation to:

(a) Identify spare parts inventory needs for operating fertilizer plants; suggest how these needs can be satisfied (what can be locally produced and what should be imported) and work out a system for continuous inventory control.

(b) Provide assistance in the establishment of preventive maintenance programs to assure a minimum of down time and methods for predicting probable trouble areas so corrective measures can be taken rapidly during planned periodic down time.

(c) Work out a plan for training of key personnel in various aspects of operation, maintenance, instrumentation, water treatment, corrosion control, safety, etc.

(d) Plan and program a strategy for the utilization of existing facilities and supplementing them with new facilities to provide the full range of fertilizers needed by Bangladesh agriculture with special attention being given to N-P and N-P-K fertilizers at minimum cost and at minimum foreign exchange expenditure.

21. Examine the organization, responsibilities and authority of the different agencies involved in production, procurement marketing and distribution of fertilizer and comment on their past and present effectiveness particularly with respect to importing and supply adequate quantities of fertilizer when and where they are needed. Make suggestions and recommendations on the future function and operations of the agencies in the fertilizer field and on any improved practices and procedures it may usefully adopt in forward planning, day to day operation, and on collecting and analyzing market information. Suggest the needs of any training program for the agencies' staff which should be instituted.

22. Prepare draft Terms of Reference for Phase II studies consisting of detailed feasibility studies for the proposed investment projects and a program for institutional improvements identified in Phase I.

University of California:
Scope of Work for USAID Plant Protection Evaluation Mission

The overall objective of this special mission should be the evaluation of the total plant protection situation in Bangladesh including an assessment of in-country plant protection capabilities in training, research and implementation. On the basis of this broad evaluation, the Mission will make recommendations of high priority actions which could significantly improve plant protection and increase food production. The mission should consider both changes in the internal distribution of plant protection resources and new potential inputs which may come from external sources in the future. Where adequate information is not available suggestions as to how such data can be obtained should be prepared and a plan of action outlined.

I. Scope of Work

A. Pesticides: Although pesticides are only one tactic in plant protection, they have become almost the only one in Bangladesh. Hence, the mission must devote a major effort to the many, often complicated, facets of pesticides use. The mission should consider the following as aspects of pesticide use in plant protection:

1. Pest control decision making: What is the decision making process in Bangladesh in determining choice of pesticide, dosage, method of application and which areas are treated? What are the differences at the Government, division (4), district (20), thana (416),

union and farmer level? What adjustments in this process can appropriately and usefully be made? For which pests on which varieties and in what areas are prophylactic treatments justified every year? How can prophylactic treatment be reduced according to prevailing weather conditions or actual infestation levels? Is a pest survey and forecasting program appropriate to Bangladesh conditions? At what level and for which pests on what crops? Are the projections for pesticide use in the First Five Year Plan realistic? What system of projections can be developed for a more realistic procurement immediately, in the medium term and long years?

2. Pesticide application: What are the relative roles and effectiveness of aerial and ground applications against the major pests under Bangladesh conditions? What suggestions can be made for change? What are the relative roles and effectiveness of granulars, emulsion concentrate sprays and ULV formulations under Bangladesh conditions? What is the current capability of ground and aerial equipment? At what level and in what ways should this capability be increased? What steps should be taken to increase local manufacturing capability of application equipment? What steps should be taken to improve equipment maintenance? Is it possible to obtain adequate hand sprayers of low unit costs which would be easier to maintain than those currently in use (see IBRD/PS-13/Retp. 15/4/13)?

3. Pesticide Management: What are the details of the distribution (transport, storage, handling) of pesticides from dock side to ultimate use and disposal of unwanted material and containers? Are

there problems of safety to man and his animals at any level in the distribution process? How can this be corrected? What are the levels of losses due to spillage, disappearance, deterioration, etc. in the distribution process? How can they be corrected? What form of inventory control on pesticides and equipment should be maintained? Do additional storage and handling facilities need to be designed and constructed? Is current design of storage facilities adequate? Is labelling and packing adequate at all levels? Does a small pesticide package need to be developed for use by the individual farmer? If so, how can this be done and what are the costs?

4. Pesticide Procurement: What are the bottlenecks if any, in pesticides procurement which prevent adequate supplies of the correct pesticide in usable condition reaching the farmer and other users? How can these be corrected? Can any suggestions be made which would reduce the long time period for procurement of pesticides? Are the A.I.D./FAO specifications being utilized for pesticides? Should they be used? Is the list of Pesticides Standardized for Bangladesh still appropriate for the level of pesticide management and other conditions in the country? If not, how might it be modified? In reviewing the list of Pesticides Standardized for Bangladesh, give consideration to which of these pesticides might be manufactured or formulated in Bangladesh at a reasonable price. In this evaluation, thought should be given to possible source of basic raw materials, savings in foreign exchange and level of industrial

sophistication required for formulation or manufacture. Is the old Pesticide Control Ordinance and Proposed Pesticide Act appropriate to conditions in Bangladesh? Can they be enforced in a reasonable manner? Are the current facilities and training of staff in the Plant Protection Department's Pesticide Laboratory adequate to maintain quality control of pesticides and conduct sufficient residue analyses?

5. Marketing System for Pesticides and Application Equipment:

What system of marketing and pricing for pesticides and application equipment can be introduced so that these essential commodities are distributed fairly, with minimal waste, and with proper consideration for their value in agricultural production? How rapidly should the subsidy on pesticides and sprayers be reduced and to what level of subsidy, if any, keeping in mind the goal of increased food production? What is the best procedure for this reduction? How can the obstacles to reduction and/or elimination of subsidies be overcome? If there is to be a change in the marketing system, should this be accomplished in one step or through several phases? The team's report should contain concrete recommendations on implementing the policy statement on subsidy reduction in the Five Year Plan. How does the current and proposed marketing system affect quality and cost of pest control?

6. Analysis of benefits and costs: What are the real benefits of current pest control practices in Bangladesh as compared to cost of these measures? How can these benefit cost ratios be improved? How

realistic are current estimates of crop losses from pests in Bangladesh? How can these estimates be improved? What special evaluation must be made of stored grain problems and of losses from rodents and birds?

B. Research: Although Bangladesh cannot afford a large research effort on the many basic and applied facets of plant protection and will for many years have to depend on external sources for most of its plant protection information, it can and should have a modest program directed at major applied problems in support of its pest control activities. For this restricted goal the mission should evaluate research programs and the research potential of the Agricultural University of Mymensingh, the Bangladesh Agricultural Institute at Dacca, the Bangladesh Rice Research Institute at Joydevpur, the Agricultural Research Institute of the Ministry of Agriculture, the Atomic Energy Commission, Dacca, the Jute Research Institute, Dacca, Commonwealth Institute of Biological Control of Insects, Dacca, and other appropriate organizations. With respect to needed research needs, the mission should consider the following: (see also Danida/FAO Rept. App.1)

1. What is the research potential of these institutions in the fields of plant protection? What steps should be taken to improve them (reorganization, new staff, facilities, training, etc.)?

2. What steps should be taken in Bangladesh to assure minimal research effort in the other (i.e., other than use of pesticides) tactics fundamental to plant protection, e.g., biological control, use of resistant plant varieties, cultural control?

3. In plant protection research in Bangladesh, what balance is appropriate among the following: (a) fundamental and applied research; (b) research on birds, rodents, plant pathogens, insects, nematodes and mites; (c) research on use of pesticides, biological control, resistant varieties and cultural control? Are pest control tactics other than pesticides economically sound and otherwise possible and practical under Bangladesh conditions?

4. Is an organizational scheme where all plant protection research staff are brought together with operational staff in a single directorate (where they would interact with each other the best) or should the staff be distributed among units which are crop oriented?

Extension: As everyone knows, research information is useless to agricultural production unless it can be transferred to people who can put it into practice. This is traditionally the role of agricultural extension services. However, traditional methodology is not always effective in environments such as those prevailing in Bangladesh. With the critical role of the agricultural extension program in mind, the mission should consider the following:

1. Are the linkages between the agricultural extension officers and the plant protection research programs in Bangladesh adequate? If not, how might they be improved? What other sources of technical information appropriate to plant protection in Bangladesh do the agricultural extension officers have? How can these be improved?

2. What is the nature of the agricultural extension program in plant protection at the levels of thana, union, village, makaddum and farmer? Are they effective? How might they be improved? (See also Danida/FAO Rept. app. 2). Is it possible to improve farmer understanding and effectiveness of plant protection through inclusion of plant protection in rural development schemes? What is appropriate size of unit in this approach?

3. What forms of extension aids are used in plant protection? Are they effective? How can they be made more effective?

D. Training: Although most of the technical staff in plant protection have bachelor's or master's degrees from Bangladesh institutions and a few have training in other countries, because of the rapid advances in modern pest control, there is a great need for additional training for these people. Staff at lower levels also will require considerable training if the plant protection system is to be up-graded appropriately. Furthermore, the rapid changes in plant protection technology and new requirements in Bangladesh underline the requirement for an expanded training component for all staff involved in plant protection in Bangladesh. The capability and effectiveness of the Bangladesh Agricultural Institute at Dacca, the Agricultural University at Mymensingh, and other institutions in Bangladesh to meet various training requirements in plant protection should be evaluated. The mission should consider the desirability of utilizing the following methods among other for training:

1. External fellowships for academic training: Determine the specialized areas in plant protection where Bangladesh is seriously deficient in expertise and external academic training is appropriate to develop this competency. Indicate the number of fellowships required in each area, length of fellowships, and suggest appropriate institutions. Design and implementation schedule.

2. External internships in programs of plant protection: Intimate association with operational training, research or implementation programs in nearby countries may be a most effective method of developing needed expertise and encouraging new approaches to pest control. For example, the integrated pest control activities at Punjab Agricultural University, Ludhiana, might be appropriate. The mission should indicate the areas in which such experience is required and suggest the number of internships, length of internship and appropriate institutions.

3. Academic training in Bangladesh institutions: The mission should outline programs of training appropriate for staff in plant protection. Systems to encourage the improvement of plant protection capability among the staff should be suggested.

4. In-service training: The mission should suggest appropriate in-service training programs for plant protection staff.

5. Short courses and workshops: The mission should define areas in which short courses and workshops would be appropriate to improvement of plant protection capability in Bangladesh. Which of these could be appropriately conducted by Bangladesh institutions and which are appropriate for cooperation with an external group e.g., the USAID/University of California Project on Pest Management?

II. Composition of Mission: The composition of the plant protection team should be:

- 1) entomologist with practical experience in integrated pest control.
- 2) plant pathologist with practical experience in tropics.
- 3) pesticide management specialist (1 month).
- 4) plant protection specialist with tropical experience with rice.
- 5) economist with cost-benefit analysis experience in developing countries (1 month).

Ideally these people should be experienced in the teaching, research and implementation aspects of plant protection. Experience with rice protection problems in South or South-East Asia would also be most useful.

It would be highly desirable to have a group of full time Bengali counterparts to increase the efficiency and effectiveness of the mission.

III. Coordination: The mission should take into consideration in making its recommendations the anticipated UNDP/FAO project in plant

protection and such other external assistance in the plant protection area as might be available in Bangladesh or anticipated for the next few years.

IV. Priorities: The mission should indicate which among its recommendations should have the highest priority treatment and provide a schedule of implementation. They should also designate those which can and should be implemented immediately and those which would be developed over a longer period of time or which require additional study and review. Those low priority items which in light of Bangladesh's current resources and needs can wait to a future time be listed.

Consumption of Fertilizer in Bangladesh (1955-73)

(In Thousand Tons)

<u>Year</u>	<u>Urea</u>	<u>TSP</u>	<u>SSP</u>	<u>MP</u>	<u>AS</u>	<u>Total</u>
1955-56	-	-	-	-	11	11
1956-57	-	-	-	-	25	25
1957-58	2	1	-	-	30	33
1958-59	4	1	-	-	30	35
1959-60	8	2	-	-	32	42
1960-61	30	6	2	1	27	66
1961-62	30	4	3	1	29	67
1962-63	40	3	3	2	25	73
1963-64	75	23	2	4	8	112
1964-65	71	19	-	4	7	101
1965-66	74	21	-	4	21	120
1966-67	119	34	-	8	6	167
1967-68	147	45	-	10	15	217
1968-69	158	52.5	.024	12.2	12.1	235
1969-70	196.5	65.5	.103	15.1	.021	277.2
1970-71	212.4	75.6	.149	17.8	.014	306
1971-72	169.7	60.1	-	13.9	-	244
1972-73	272	88	-	18	-	378

Retail Dealers in Bangladesh by District

(both primary cooperative societies and private retail dealers)

<u>District</u>	<u>No. of Dealers</u>
1. Dacca	4,244
2. Mymensingh	1,731
3. Kishoreganj	1,928
4. Tangail	474
5. Faridpur	872
6. CTG Hill Tracts	310
7. Chittagong	3,920
8. Noakhali	1,888
9. Comilla	3,524
10. Sylhet	943
11. Rajshahi	1,089
12. Dinajpur	859
13. Rangpur	1,616
14. Bogra	731
15. Pabna	870
16. Khulna	470
17. Bakerganj	1,427
18. Patuakhali	304
19. Jessore	904
20. Kushtia	682

Total number of dealers = 28,786

BADC Godowns and Their Capacities

BADC Owned Fertilizer Stores

<u>Type of Fertilizer Stores</u>	<u>Number</u>	<u>Capacity</u>
Transit	4	32,000
Big	37	37,000
Inter. Godown	24	12,000
Thana	219	<u>54,600</u>
Sub-Total		135,600

Hired Stores

Transit	17	14,988
Inter. Godown	252	110,791
Thana Godown	770	<u>80,225</u>
Sub-Total		<u>206,004</u>
TOTAL		<u><u>341,604</u></u>